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Notice of Allowability

Application No.

10/695,166

Examiner

Aslan Ettehadieh

Applicant(s)

TELLADO ET AL.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 6/26/2006.
2. ☒ The allowed claim(s) is/are 1,6,7,9,11-25,27-36 and 39-41.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

DETAILED ACTION

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.
2. Authorization for this examiner's amendment was given in a telephone interview with Brian Short (Registration Number 41309) on 12/13/06.
3. Applicant's authorization for amending claims 1, 7, 9, 11, 27 – 29, 39, 40, and 41 and applicant's authorization for cancellation of claims 2 – 5, 8, 10, 26, 37 – 38, and 42 – 44 is acknowledged.
4. Amendment to claim 1 is as follows:

A transceiver comprising:

the transceiver receiving a plurality of digital signal streams, at least one of the plurality of digital signal stream being coupled to another of the plurality of digital signal streams;

a transform block for transforming the plurality of the digital signal streams from an original domain into a lower complexity domain;

a processor for joint processing of the transformed plurality of digital signal streams, each of the joint processed digital signal streams being influenced by other of the joint processed digital signal streams, wherein the joint processed includes

multiplying samples of the transformed plurality digital signal streams by a processing matrix; and

an inverse transform block for inverse transforming the joint processed signal streams back to the original domain;

wherein the transceiver is receiving the plurality of digital signal streams, and the diagonal elements of the processing matrix are adaptively selected to cancel transmission cross-talk and reduce inter-symbol interference of the plurality of digital signal streams introduced during transmission depending upon signal coupling and inter-symbol interference measurements.

5. Amendment to claim 7 is as follows:

A transceiver comprising:

the transceiver receiving a plurality of digital signal streams, at least one of the plurality of digital signal stream being coupled to another of the plurality of digital signal streams;

a transform block for transforming the plurality of the digital signal streams from an original domain into a lower complexity domain;

a processor for joint processing of the transformed plurality of digital signal streams, each of the joint processed digital signal streams being influenced by other of the joint processed digital signal streams, wherein the joint processed includes multiplying samples of the transformed plurality digital signal streams by a processing matrix, wherein off-diagonal elements of the processing matrix are adaptively selected

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to reduce cross-talk between the plurality of digital signal streams and reduce inter-symbol interference depending upon signal coupling and inter-symbol interference measurements of the plurality of digital signal streams;

an inverse transform block for inverse transforming the joint processed signal streams back to the original domain;

6. Amendment to claim 9 is as follows:

A transceiver comprising:

the transceiver receiving a plurality of digital signal streams for transmission;

a transform block for transforming the plurality of the digital signal streams from an original domain into a lower complexity domain;

a processor for joint processing of the transformed plurality of digital signal streams, each of the joint processed digital signal streams being influenced by other of the joint processed digital signal streams, wherein the joint processed includes multiplying samples of the transformed plurality digital signal streams by a processing matrix; and

an inverse transform block for inverse transforming the joint processed signal streams back to the original domain;

wherein the transceiver is transmitting the inverse transformed joint processed digital signal streams, and off-diagonal elements of the processing matrix are adaptively selected to provide process cross-talk between the digital signal streams, which cancel transmission cross-talk of the digital signal streams introduced during transmission of

the transformed joint processed signal streams, and to reduce inter-symbol interference depending upon signal coupling and inter-symbol interference measurements of the plurality of digital signal streams.

7. Amendment to claim 11 is as follows:

A transceiver comprising:

the transceiver receiving a plurality of digital signal streams for transmission;
a transform block for transforming the plurality of the digital signal streams from an original domain into a lower complexity domain;

a processor for joint processing of the transformed plurality of digital signal streams, each of the joint processed digital signal streams being influenced by other of the joint processed digital signal streams, wherein the joint processed includes multiplying samples of the transformed plurality digital signal streams by a processing matrix; and

an inverse transform block for inverse transforming the joint processed signal streams back to the original domain;

wherein the transceiver is receiving the plurality of digital signal streams, and the diagonal elements of the processing matrix are adaptively selected to cancel transmission echo cross-talk of the plurality digital signal streams introduced during reception of the digital signal streams, and to reduce inter-symbol interference depending upon signal coupling and inter-symbol interference measurements of the plurality of digital signal streams.

8. Amendment to claim 27 is as follows:

A transmitter comprising:

the transmitter receiving a plurality of digital signal streams for transmission, at least one of the plurality of digital signal stream being coupled to another of the plurality of digital signal streams;

a transform block for transforming the plurality of the digital signal streams from an original domain into a new domain that allows for less complex processing;

a processor for joint processing of the transformed plurality of digital signal streams in the new domain, each of the joint processed digital signal streams being influenced by other of the joint processed digital signal streams, wherein the joint processing includes multiplying samples of the plurality of transformed digital signal streams by a processing matrix; and

an inverse transform block for inverse transforming the joint processed signal streams back to the original domain;

wherein the transmitter is transmitting the inverse transformed joint processed digital signal streams, and diagonal elements of the processing matrix are adaptively selected to provide process cross-talk between the digital signal streams, which cancel transmission cross-talk of the digital signal streams introduced during transmission of the transformed joint processed signal streams, and to reduce inter-symbol interference depending upon signal coupling and inter-symbol interference measurements of the plurality of digital signal streams.

9. Amendment to claim 28 is as follows:

A receiver comprising:

an analog front end for receiving analog signal streams, and generating a plurality of digital signal streams, at least one of the plurality of digital signal stream being coupled to another of the plurality of digital signal streams;

a transform block for transforming the plurality of the digital signal streams from an original domain into a new domain that allows for less complex processing;

a processor for joint processing of the transformed plurality of digital signal streams in the new domain, each of the joint processed digital signal streams being influenced by other of the joint processed digital signal streams, wherein the joint processing includes multiplying samples of the plurality of transformed digital signal streams by a processing matrix; and

an inverse transform block for inverse transforming the joint processed signal streams back to the original domain;

wherein the receiver is receiving the plurality of digital signal streams, and the diagonal elements of the processing matrix are adaptively selected to cancel transmission cross-talk and to reduce inter-symbol interference of the plurality of digital signal streams introduced during transmission of the plurality digital signal streams depending upon signal coupling and inter-symbol interference measurements of the plurality of digital signal streams.

10. Amendment to claim 29 is as follows:

A method of joint processing a plurality of digital signal streams;
transforming a plurality of the digital signal streams from an original domain into a lower complexity processing domain;
joint processing of the transformed plurality of digital signal streams, each of the joint processed digital signal streams being influenced by characteristics of other of the joint processed digital signal streams, wherein the joint processing includes multiplying samples of the plurality of transformed digital signal streams by a processing matrix;
an inverse transform block for inverse transforming the joint processed signal streams back to the original domain;
adaptively selecting diagonal elements of the processing matrix to cancel transmission cross-talk and reduce inter-symbol interference of the plurality digital signal streams introduced during transmission of the plurality digital signal streams depending upon signal coupling and inter-symbol interference measurements of the plurality of digital signal streams.

11. Amendment to claim 39 is as follows:

A network line card, the network line card comprising a bi-directional transceiver, the bi-directional transceiver comprising:
the transceiver receiving a plurality of digital signal streams, at least one of the plurality of digital signal stream being coupled to another of the plurality of digital signal streams;

a transform block for transforming the plurality of the digital signal streams from an original domain into a lower complexity domain;

a processor for joint processing of the transformed plurality of digital signal streams in the new domain, each of the joint processed digital signal streams being influenced by other of the joint processed digital signal streams, wherein the joint processing includes multiplying samples of the plurality of transformed digital signal streams by a processing matrix; and

an inverse transform block for inverse transforming the joint processed signal streams back to the original domain;

wherein the transceiver is receiving the plurality of digital signal streams, and the diagonal elements of the processing matrix are adaptively selected to cancel transmission cross-talk and reduce inter-symbol interference of the plurality of digital signal streams introduced during transmission depending upon signal coupling and inter-symbol interference measurements.

12. Amendment to claim 40 is as follows:

A server comprising a bi-directional transceiver, the bi-directional transceiver comprising:

the transceiver receiving a plurality of digital signal streams, at least one of the plurality of digital signal stream being coupled to another of the plurality of digital signal streams;

a transform block for transforming the plurality of the digital signal streams from an original domain into a lower complexity domain;

a processor for joint processing of the transformed plurality of digital signal streams, each of the joint processed digital signal streams being influenced by other of the joint processed digital signal streams, wherein the joint processing includes multiplying samples of the transformed plurality digital signal streams by a processing matrix; and

an inverse transform block for inverse transforming the joint processed signal streams back to the original domain;

wherein the transceiver is receiving the plurality of digital signal streams, and the diagonal elements of the processing matrix are adaptively selected to cancel transmission cross-talk and reduce inter-symbol interference of the plurality of digital signal streams introduced during transmission depending upon signal coupling and inter-symbol interference measurements.

13. Amendment to claim 41 is as follows:

A LAN system comprising a bi-directional transceiver, the bi-directional transceiver comprising:

the transceiver receiving a plurality of digital signal streams, at least one of the plurality of digital signal stream being coupled to another of the plurality of digital signal streams;

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a transform block for transforming the plurality of the digital signal streams from an original domain into a lower complexity domain;

a processor for joint processing of the transformed plurality of digital signal streams, each of the joint processed digital signal streams being influenced by other of the joint processed digital signal streams, wherein the joint processing includes multiplying samples of the transformed plurality digital signal streams by a processing matrix; and

an inverse transform block for inverse transforming the joint processed signal streams back to the original domain;

wherein the transceiver is receiving the plurality of digital signal streams, and the diagonal elements of the processing matrix are adaptively selected to cancel transmission cross-talk and reduce inter-symbol interference of the plurality of digital signal streams introduced during transmission depending upon signal coupling and inter-symbol interference measurements.

Allowable Subject Matter

Claims 1, 6, 7, 9, 11 – 25, 27 – 36, and 39 – 41 are allowed. The following is an examiner's statement of reasons for allowance:

A comprehensive search of prior art of record failed to teach, either alone or in combination, a method/apparatus for receiving a plurality of digital signal streams for transmission; a transform block for transforming the plurality of the digital signal streams from an original domain into a lower complexity domain; a processor for joint processing

of the transformed plurality of digital signal streams, each of the joint processed digital signal streams being influenced by other of the joint processed digital signal streams, wherein the joint processed includes multiplying samples of the transformed plurality digital signal streams by a processing matrix; and an inverse transform block for inverse transforming the joint processed signal streams back to the original domain; wherein the elements of the processing matrix are adaptively selected to reduce cross-talk between the plurality of digital signal streams and reduce inter-symbol interference depending upon signal coupling and inter-symbol interference measurements of the plurality of digital signal streams; and an inverse transform block for inverse transforming the joint processed signal streams back to the original domain as recited in the independent claims and in combination with other elements of the claims.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Other prior art cited

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

14. Nordstrom et al. (US 2001/0006510) discloses relevance to independent claims (paragraphs 41, 44).
15. Ginis et al. (US 2003/0086514) discloses relevance to independent claims (paragraphs 115, 120, 122, 124, 128, 132, 143 – 148, 169, 171 – 174).

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16. Wu et al. (US 2005/0259757) discloses relevance to independent claims (paragraph 20).

17. Huang (US 2003/0072380) discloses relevance to independent claims.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aslan Ettehadieh whose telephone number is (571) 272-8729. The examiner can normally be reached on Monday - Friday, 8:00am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammed Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Aslan Ettehadieh
Examiner
Art Unit 2637

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PRIMARY EXAMINER